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EVALUATION OF THE SOUTHERN PINE BEETLE INFESTATIONS ON THE DANIEL BOONE NATIONAL FOREST, KENTUCKY

By

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INTRODUCTION

Aerial sketchmap surveys covering 616,859 acres, were conducted on the Daniel Boone National Forest in August 1976. The surveys were followed by subsequent ground examinations conducted by the Forest Insect and Disease Management Group to determine the status and trend of southern pine beetle populations on the Forest.

The southern pine beetle infestations in Kentucky are part of a southwide outbreak involving 13 states. Southern pine beetle populations were first detected on the Daniel Boone National Forest in 1975.

METHODS

One hundred percent operational presuppression flights conducted on the Stearns, Somerset and London Ranger Districts by District personnel were used for this evaluation. A portion of the spots detected in the surveys were examined on the ground by Forest Insect and Disease Management personnel to confirm the cause of mortality and the level of southern pine beetle activity in the infested area.

TECHNICAL INFORMATION

Insect - Southern pine beetle, Dendroctonus frontalis Zimm.

Hosts - Southern pine beetle is a native forest pest that will attack all species of southern yellow pine. Susceptible southern yellow pines on the Daniel Boone National Forest are Virginia (Pinus virginiana Mill.), shortleaf (P. echinata Mill.), and pitch (P. rigida Mill.)

Type of Damage - Death of the tree is the result of mining in the cambium by the southern pine beetle as it constructs egg galleries. The beetle also introduces blue stain fungi, Ceratocystis spp., which slow down or block conduction of water in the stem. The size of an infestation may range from a single tree to several thousand trees.

Life Cycle of the Beetle - Southern pine beetles attack in pairs and construct a winding gallery in the cambium. Eggs are deposited in niches along the sides of the galleries. The eggs hatch into whitish grubs that further mine the cambium and then construct cells in the bark where they pupate and change to adults. The new adults then mine through the bark to emerge. The complete life cycle takes about a month during the summer, and as many as four or five generations may be produced annually in the area.

RESULTS AND DISCUSSION

Overall, southern pine beetle activity is down on all three Districts as compared to last year. Very little activity was located on the Somerset District. Four spots were detected on the aerial survey. These were determined to be inactive when checked on the ground. Most activity occurred within two areas of infestation located on the Stearns and London Ranger Districts.(Fig. 1).

Tables 1 and 2 summarize the aerial survey and ground check data for the Stearns and London Districts.

Most activity occurred on the Stearns District. There was less than one spot per M acres of host type (h.t.), however, spots were large with an average of 53 trees per spot. There was an estimated 20 infested trees per M acres h.t. Almost all spots occurred south of the New Liberty Lookout along Jacks Creek and Peter Branch. There is an estimated 127.2 MBF of timber currently infested. All of the spots that were checked on the ground were actively infested with southern pine beetle.

Southern pine beetle activity on the London District also declined. Spots were small, ranging from one to eight trees in size, with an average spot size of less than 4 trees. There was less than one spot per M acres h.t. All activity was located in an area south of Cumberland Falls State Park between highway 90 and the Cumberland River. This is just north of the New Liberty Tower on the Stearns District. There was

estimated to be less than one infested tree per M acres of h.t. Currently, an estimated 5.0 MBF of timber are infested with southern pine beetle. Fourty percent of the spots checked on the ground were actively infested.

The two areas of high southern pine beetle activity on the Stearns and London Districts are located in what was the paths of tornados occurring on the Daniel Boone National Forest in 1974. It was in these tornado damaged areas that the majority of the initial southern pine beetle infestation was located and reported in 1975.

RECOMMENDATIONS

Southern pine beetle populations are low on the Somerset and London Ranger Districts. Based on the information obtained for the biological evaluation, the decline in activity and the presuppression and suppression activities reported by the Districts during the past year, it is recommended that the southern pine beetle projects be terminated on these Districts. However, it is recommended that personnel on the London District continue to watch for any indication of increasing activity, especially in areas with a past history of southern pine beetle activity. If increased activity is noted on either District, the Forest Insect and Disease Management Group should be contacted and another evaluation will be conducted.

Although southern pine beetle activity has decreased on the Stearns District, activity still remains at a high level. It is recommended that the southern pine beetle project be continued on this District with the emphasis of suppression efforts being directed to the concentrated area of activity indicated earlier in the report. It is stressed that the District personnel make an effort to conduct regular presuppression flights and conduct suppression activities as outlined in, and in accordance with the Southern Pine Beetle Control Plan for the Daniel Boone National Forest and FSM 5250.

REFERENCES

Barry, P. J. and I. R. Ragenovich. 1976. Evaluation of southern pine beetle infestations on the London and Somerset Districts, Daniel Boone National Forest, Kentucky. U.S.D.A. For. Serv. SA, S&PF, Forest Insect and Disease Management Group, Report No. 76-1-18.

Thompson, J. H. and R. F. Bassett. 1975. Evaluation of southern pine beetle infestations on the Daniel Boone National Forest, Kentucky. U.S.D.A. For. Serv., SA, S&PF, Forest Insect and Disease Management Group. Report No. 76-1-9.

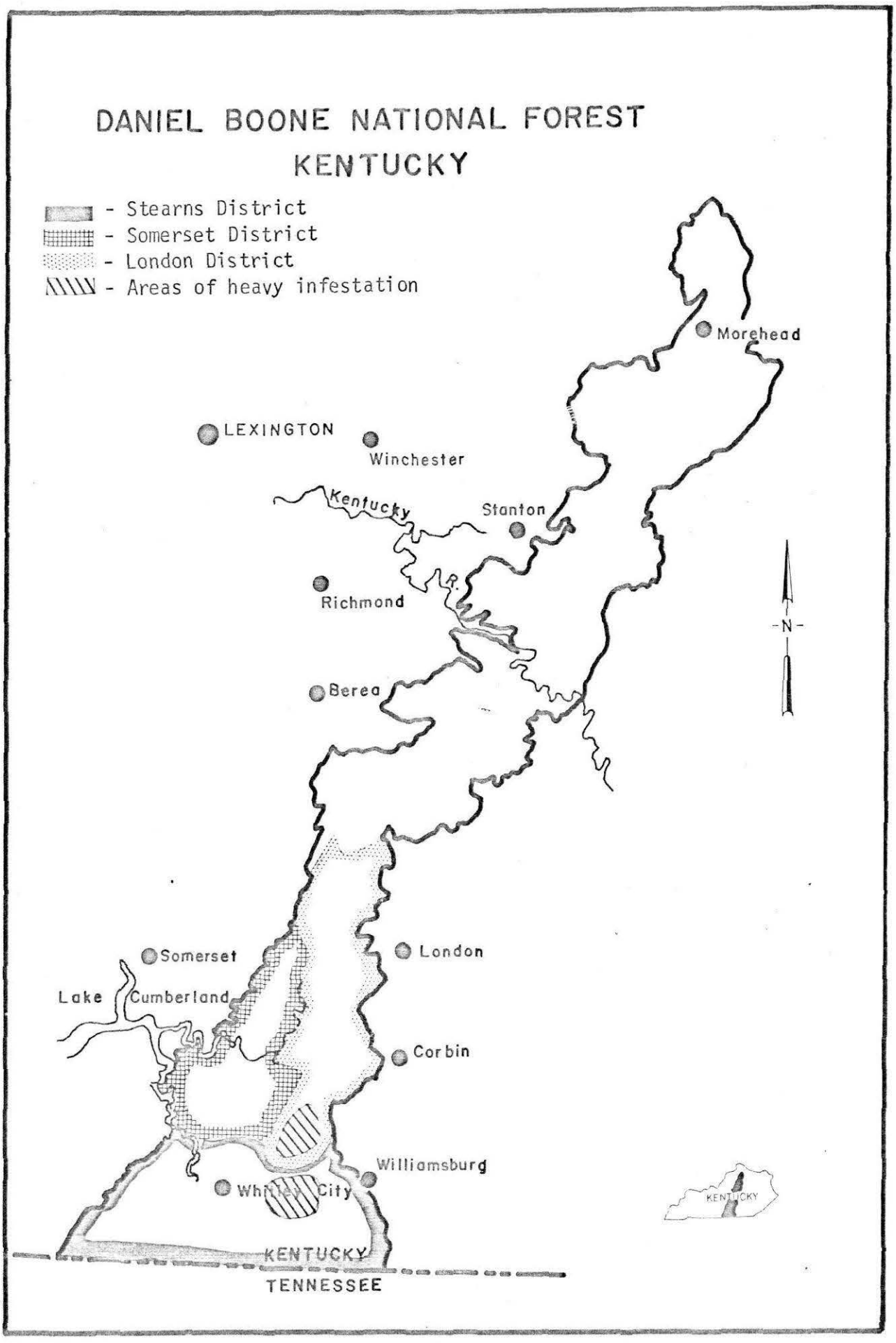

Figure 1. Map of districts included in the southern pine beetle evaluation showing areas of heaviest infestations on the Daniel Boone National Forest, Kentucky, 1975.

Table 1. Summary of results of the southern pine beetle evaluations conducted on the Stearns and London Ranger Districts, Daniel Boone National Forest, Kentucky, 1976.

	Ownership Unit	
	Stearns R.D.	London R.D.
1. Results compiled from data collected during the aerial phase of the evaluation:		
Survey type	Sketchmap	Sketchmap
Date of aerial survey	8-11-76	8-11-76
Percent survey	100%	100%
Total acreage surveyed	283,705	194,709
Total acreage of Forest Service land	132,000	87,000
Susceptible host type acreage of Forest Service land	66,000	43,500
Total number of spots within the survey boundary	79	32
Total number of spots on Forest Service lands	38	21
Spots per M acre of host type Forest Service lands	0.6	0.5
Average spot size (trees) Forest Service lands	52.6	3.7
Range of spot sizes (trees) Forest Service lands	1-400	1-8
Reds and faders/M acres host type on Forest Service lands	30.3	1.8
2. Results compiled from data collected during the ground and aerial phases of the evaluation:		
Date of ground phase	8-31-76	9-02-76
Infested trees per M acre of host type Forest Service lands	20.1	0.9
Total number of infested trees on Forest Service lands	1,339	38
Total volume of infested trees on Forest Service lands	127.2 MBF	5.0 MBF
Total number of affected trees on Forest Service lands	2,837	116
Total volume of affected trees on Forest Service lands	191.5 MBF	12.1 MBF
Ratio of green infested to total red and fading trees	1:4	1:3

Volume - BF - based on Scribner decimal C log rule. Cords converted to bd. ft. based on 500 bd. ft. per cord.

Table 2 -- Summary of Aerial Survey Data - 1/ Southern pine beetle evaluation on the Stearns and London Ranger Districts, Daniel Boone National Forest, Kentucky, 1 5.

Ownership	Infestation Size (# Trees)											
		2-5		6-20		21-50		50+100		100+		Total	
	Singles	Spots	Trees	Spots	Trees	Spots	Trees	Spots	Trees	Spots	Trees	Spots	Tre
Stearns R.D.	9	6	26	8	96	5	192	7	575	3	1100	38	1998
London R.D.	2	15	48	4	28	-		-		-		21	78

1/ Corrected for 100%